SRTM topography of Kachchh, India: Applications to the 26 January 2001 Earthquake Geomorphology and Co-seismic Strain*

Eric J Fielding[1] (818-354-9305; Eric.Fielding@jpl.nasa.gov)
Roger Bilham[2] (bilham@stripe.colorado.edu)
Francois Rogez[1] (Francois.Rogez@jpl.nasa.gov)
Scott Hensley[1] (Scott.Hensley@jpl.nasa.gov)
Paul A Rosen[1] (Paul.A.Rosen@jpl.nasa.gov)
Karl Mueller[2] (Karl.Mueller@colorado.edu)

[1] Mail Stop 300-233, Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Drive, Pasadena, CA 91109, U.S.A.
[2] Dept. of Geological Sciences, University of Colorado, Boulder CO 80309, U.S.A.

Digital topographic data, usually called a digital elevation model or DEM, is valuable both for quantifying the tectonic geomorphology of active faults and for processing co-seismic interferograms. A preliminary DEM has been produced from data acquired by the Shuttle Radar Topography Mission (SRTM) in February 2000. The simultaneous interferometry of the SRTM avoids the atmospheric changes that bedevil uses of repeat-pass interferometry for DEM production. A mosaic of four SRTM swaths was used to better cover the Kachchh area at a grid spacing of 30 meters. The system is not fully calibrated yet, but the DEM allows the identification and measurement of extended elevation features with heights less than 10 m, although individual spot heights have greater variation. One early result is the identification of the Allah Bund, the low ridge uplifted by the 1819 M=7.7 earthquake in the northwest Rann of Kachchh, despite the substantial erosion that has occurred in the last 182 years. The remaining Allah Bund has a height of 3-6 meters. Other small topographic features may be related to other faults, possibly connected to the deep fault activated in 2001. Differential SAR interferometry, if it becomes available for this earthquake, is also sensitive to topography. The SRTM DEM will be valuable for removing topographic signals from these data.

* Portions of this research were carried out at the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.